

**K L UNIVERSITY****REMOTE SENSING & GIS FOR NATURAL RESOURCES MANAGEMENT (09-OE407)****SYLLABUS**

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**UNIT – 1****Introduction of Remote Sensing**

Definition, History of Remote Sensing. Basic components of Remote sensing, Electromagnetic Remote sensing process, Passive and active remote sensing. Electromagnetic Spectrum, Spatial Resolution, Spectral Resolution and Radiometric Resolution, Characteristics of Various sensors and satellites: IRS, Fundamentals of Image Processing.

**Fundamentals of GIS:** A brief history of GIS, GIS architecture, Components of a GIS, GIS workflow, Theoretical models of GIS: Functional elements, Fundamental operations, Theoretical framework, GIS categories, Levels/scales of measurement. The data stream, Data input methods: Keyboard entry, Manual digitizing, Scanning and automatic digitizing, Raster and Vector GIS models. Data editing.

**UNIT – 2****Water Resources**

The hydrological cycle, The drainage basin, Channel networks, Automatic derivation of catchment characteristics, Watershed and people, Watershed characteristics, watershed management and Integrated approach for sustainable planning. Water quality modeling. Watershed Management in India, Case studies **Agriculture & Forestry Resources:** Crop type classification, area estimates, and spectral response of different crops. Crop and Water management and monitoring. Advances in Crop monitoring. Survey and mapping of forest cover, Forest change detection, Forest damage assessment and Forests monitoring, Land evaluation for forestry.

**UNIT – 3**

**Land Resources:** Significance of Land Use and Land Cover Information, Land Use classification, Land evaluation and suitability studies by Remote sensing and GIS. Techniques of land use / land cover map preparation. Land use / land cover mapping and planning. land use change, broad – scale land cover studies Preparation of Land Resources Action plan

**UNIT – 4****Geosciences**

Role of Remote sensing and GIS in geological studies and case studies. Evaluation of Geological Mapping, Introduction to Prospection Techniques, History of Remote Sensing in Geological Exploration. Image Lineaments and structural origin, Prospecting, Applications of thermal and Radar remote sensing in structural geology. Spectral response of Minerals, Rocks, Alterites, case studies

**UNIT – 5**

**Ecosystem Modeling:** Spectral response of vegetation and mapping, Ecosystem Analysis, Environmental impact analysis and monitoring, Ecosystem modeling, Wetland mapping. Spatial Models of Ecological Systems and Process. Environmental Information System Development for Natural Resources management. **RS and GIS for Disaster Management:** Introduction and Overview- Natural and man made hazards – Vulnerability assessment and Mapping on Disasters- Spatial Information for natural Hazard and risk assessment -Land slides- volcanoes- floods and famines- earth quakes- Drought hazard and risk assessment- - dams- constructional and others.

**Text books:**

1. Environmental Modelling with GIS, Michael F. Goodchild, Bradley O. Parks, Louis T. Steyaert
2. Lillesand, T.M. and Kiefer R.W. Remote Sensing and Image Interpretation, John Wiley and Sons, Inc, New York, 1987.

**Reference Books:**

1. Manual of Geospatial Science and Technology Edited By John. D. Bossler, Taylor And Francis, London
2. M.Anji Reddy, Text book of Remote sensing and GIS by, BSP Publications, Hyderabad, 2001.
3. M.Anji Reddy, Geoinformatics for Environmental Management, BS Publications, 2004
4. Geographical Information Systems by David Martin
5. RS in Geology by Siegal
6. RS in Forest Resources by John. A. Howard, Chapman and Hall.